EXPERIENCES WITH AERIAL DUSTING IN THE KERN MOSQUITO ABATEMENT DISTRICT—1967

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A record volume of water from the Kern River watershed in 1967, more than three times normal, resulted in flooding of several thousand acres south and west of Bakersfield for long periods of time. Much of this acreage developed into ideal sources of *Culex tarsalis,* the vector of encephalitis in California.

As temperatures increased with the advancing summer season, we experienced increasing larval populations of *C. tarsalis.* We found it necessary to apply liquid larvicides by air at weekly to 10-day intervals over much of the flooded region. Vegetative canopies of grass, brush and trees became quite dense, affecting the results of our larvicide applications. These were made as aqueous solutions of methyl parathion at ½ gallon per acre or as ULV sprays of Baytex or malathion at 2½ to 8 ounces per acre. Of the two spraying techniques, the ULV applications proved superior to the aqueous. Neither, however, was adequate, presumably because of the dense vegetative canopy in many locations.

In June, the *C. tarsalis* larval density had reached a level of 50 per dip under a heavy canopy of mesquite and grass over hundreds of acres. Obviously the aerial spraying was not getting the job accomplished.

These circumstances indicated the necessity of changing our approach if we hoped to attain any degree of control of *C. tarsalis.* Following discussion with pesticide

formulators and regulating agencies, we decided to try a parathion dust formulation. This we obtained as a 2 percent ethyl parathion from Wilbur-Ellis Company, Fresno, Calif. The dust was prepared from a local anhydrous, alkaline, aluminum silicate with a Ph of 5.4–6.5 known as Frianite. It was screened through a 325 mesh screen to provide an average particle size of 44 microns. In preparing the dust, a 98½ percent technical parathion was sprayed within a ribbon blender to impregnate and coat the particles.

The airplane used in applying the dust was a Call-Air A-9, equipped with a standard Swathmaster, Jr. Spreader. In application, the dust was gravity-released from the hopper to the spreader.

Limited swath pattern evaluations indicated a swath of 220 to 300 feet. The first application made with the dust and equipment described was over a location where we had previously failed to obtain satisfactory results with our liquid sprays. Flying 90 miles per hour at heights of 30 to 50 feet, necessary to clear the trees and brush, the dust was applied at 2.5 lbs. per acre across swaths of 200 feet with a parathion dosage of 0.049 lb. per acre.

Results were more than surprising. No live larvae could be found where, prior to treatment, counts up to 50 per dip were common. In addition to numerous dead larvae, dead adult *tarsalis* were found floating upon the water surface where vegetative canopy was most dense. In subsequent applications, we continued to obtain results similar to those experienced with the first trial. The minimum dosage rate attempted was .033 lb. of parathion per acre applying a gross of 1 2/3 lbs. of dust per acre. At this rate of application highly effective results were obtained. More than 20 tons of 2 percent parathion dust was used by the District in 1967 with excellent results.

One such application for control of *Aedes nigromaculus* was made over a 420 acre area containing all aquatic stages plus a heavy infestation of adults (average landing rate of 30–50 per minute). In this instance, swath width was 260′ from an elevation of approximately 15′. Application rate was 2 lbs. of dust per acre, equalling .04 lb. actual ethyl parathion per acre. Pupae were the only survivors. No adults or larval stages could be found during an intensive 24-hour post-treatment inspection. Limited larviciding trials with 4 percent malathion, 4 percent parathion and 2 percent Baytex dust formulations were also completed during the season. Although complete kills were not obtained with these trials, results were encouraging. Larval reduction averaged from 85 percent to 98 percent.

One malathion application seemed most interesting. This was made over 20 acres of duck clubs containing a heavy population of all larval stages of *Culex tarsalis,* plus pupae. The dust was applied at a rate of 2.8 lbs. per acre with 100′ swaths. Dosage of malathion equalled 0.112 lb. per acre. The 24-hour post-treatment inspection disclosed survival of 4th stage larvae and pupae but complete mortality of first through third stages. We usually consider one-half pound of malathion per acre essential for effective larviciding purposes. In this instance, we obtained complete kill of first through third larval stages at a dosage rate of approximately ⅓ that normally used.

Our experiences larviciding and adulticiding with dust have not shown it to be a panacea; in a few instances, we had applications turn out to be complete failures. We do not know why we experienced these failures but suspect it was a mechanical problem, one of not getting the dust to the target. We have observed that, on occasion, wind drift will move the dust completely off the intended swath, and we suspect that under certain weather conditions, the dust will not settle upon open water. We had successful dusting applications in winds exceeding 10 m.p.h. when allowance was made for an adequate margin of drift. Over wooded areas when allowing for drift, winds actually seemed to improve results.